

10/568040

IAP20 Rec'd PCT/PTO 13 FEB 2006  
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of MARIONI

Application No.

Examiner:

Filed: Herewith

Group Art Unit:

For: IMMERSION PUMP EQUIPPED WITH A FLOAT CONTROL DEVICE

**SUBMISSION OF COPY OF INTERNATIONAL APPLICATION**

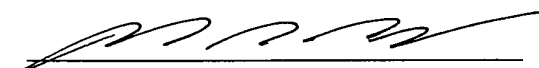
Mail Stop PCT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Please find attached a copy of the International application as published. Please note that these claims are for informational purposes only, as they are amended in the Annex to the International Preliminary Report on Patentability and further in a Preliminary Amendment.

Respectfully submitted,

Dated: 2-13-06

  
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Docket No. 7202-106

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PATENT

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Application No.

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Group Art Unit:

For: IMMERSION PUMP EQUIPPED WITH A FLOAT CONTROL DEVICE

**SUBMISSION OF COPY OF ANNEXES TO INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY**

Mail Stop PCT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Please find attached a copy of the Annex to the International Preliminary Report on Patentability. Please note that these claims are for informational purposes only, as they are further amended the Preliminary Amendment filed herewith.

Respectfully submitted,

Dated: 2-13-06



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Docket No. 7202-106

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Title: Immersion pump equipped with a float control device.

Field of application

In its more general aspect the present invention relates to an immersion pump driven by a permanent-magnet synchronous electric motor and particularly, but not exclusively, suitable for a submersed installation in drain basins or tanks or in a sewage floodway.

More particularly, the invention relates to a synchronous pump structure, particularly an immersion pump equipped with a float control device and comprising a synchronous electric motor with a permanent-magnet rotor.

10 Prior art

As it is well known to the skilled in the art, immersion pumps are used to rapidly pump down sewage collection tanks or however when fluids flowing in a recess are to be discharged, whose draining requires the fluid to exceed a given head.

15 A typical application in the civil field is represented by pumping down sewage collection basins or tanks positioned in underground rooms located at a lower level than the corresponding sewerage network.

Other applications occur in the building field for dumping down water-wells formed after digging for making foundations.

20 A float control device comprising a level sensor of the fluid to be discharged is generally associated to an immersion pump; the sensor allows the pump to be turned on when the fluid level is kept above a predetermined threshold and the pump to be turned off when the fluid level reaches a minimum value.

25 The German patent n° DE 3607466A describes a unit pump with a float level regulator housed in a guide located parallel to the body of the pump. The guide guides the float in its displacements. The float comprises at least one magnet (15), which acts at least on a Hall generator controlling the triggering of the regulator. A control device connects the Hall generator  
30 and switches provided for monitoring pump functions:

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switch-on and switch-off.

- Such pumps are advantageously realised with permanent-magnet synchronous motors which are cheap and very reliable and they have the only drawback of a difficult turn-on due to the need to overcome the initial
- 5 load inertia before reaching a steady synchronism state.

Several solutions can be adopted to remove this drawback by providing for example the use of convenient electronic driving circuits, or by providing

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## CLAIMS

1. A synchronous pump structure, particularly an immersion pump (1) equipped with a float control device (3) and comprising a synchronous electric motor (2) with a permanent-magnet rotor (8), characterised in that the float (16) of said control device (3) is incorporated in a chamber of an envelope (11), externally associated with the body (15) of the pump (1), said envelope (11) comprising a base (13) rotary mounted on said body (15) and a sensor element (4) of said control device (3) is housed in said body (15) in correspondence with said base (13), said float (16) is moving freely inside said chamber providing in a reciprocal separation and approach with said sensor element (4) along an axis coincident or misaligned with a vertical axis of said sensor element (4) in according to said base (13) position.
2. A pump structure according to claim 1, characterised in that said sensor element is a level sensor (4) of the Hall-effect magnetic type.
3. A pump structure according to claim 1, characterised in that said float (16) is equipped in its lower part with a permanent magnet (19).
4. A pump structure according to claim 1, characterised in that said envelope (11) comprises said base (13) that is a cylindrical-cup-shaped portion and a lid (20) defining with said base portion (13) said closed chamber.
5. A pump structure according to claim 4, characterised in that the lid (20) comprises a knob (22) which can be handled by a user to adjust the position of the float (16) on the horizontal plane.
6. A pump structure according to claim 2, characterised in that said Hall effect sensor (4) comprises a probe (27) mounted on an electronic board housed in the pump body (15) in a position underlying the float (16).
7. A pump structure according to claim 4, characterised in that said base portion (13) has a side wall (23) equipped with a grate (29) to put the internal part of the envelope (11) in fluid communication with the external environment.

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8. A pump structure according to claim 7, characterised in that internally, close to that side portion (23), a semi-cylinder-shaped filter element (14) is provided.
- 5 9. A pump structure according to claim 8, wherein said filter (14) is kept in position by two opposite bulkheads (24, 30) partially projecting towards the internal part of the envelope (11).
10. A pump structure according to claim 2, wherein the position of the float (16) can be manually adjusted in order to be misaligned with respect to said sensor element (4).
- 10 11. A pump structure according to one or more previous claims, characterised in that said envelope (11) is located in an upper part (12) of said pump body (15).

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